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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/899,951	07/09/2001	Koji Shimazawa	033211-011	5936

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EXAMINER	
BEACHAM, CHRISTOPHER R	
ART UNIT	PAPER NUMBER
2653	9

DATE MAILED: 12/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/899,951	SHIMAZAWA, KOJI	
	Examiner	Art Unit	
	Christopher R. Beacham	2653	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) _____ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-14 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 09 July 2001 is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Drawings

Figures 1 and 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> *(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.*

1. Claims 1-3, 5-10 and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (hereinafter AAPA) (pgs. 2-4) in view of Lee (US 4,195,323).

- Regarding claims 1-3, 5, 8-10 and 12, AAPA shows a magnetoresistive effect thin-film magnetic head comprising:

a lower shield layer 20;

a lower gap layer 21 made of a nonmagnetic electrically conductive material and laminated on said lower shield layer 20;

a magnetoresistive effect multilayer 22 in which a current flows in a direction perpendicular to surfaces of layers of said magnetoresistive effect multilayer 22, said magnetoresistive effect multilayer being laminated on said lower gap layer 21;

an upper gap layer 23 made of a nonmagnetic electrically conductive material and laminated on said magnetoresistive effect multilayer 22;

an insulation gap layer 26 formed around said magnetoresistive effect multilayer 22 and said upper gap layer 23, at least a part of said insulation gap layer 26 being made of an insulation material of Al_2O_3 ; and

an upper shield layer 24 laminated on said upper gap layer 23 and said insulation gap layer 26.

First, AAPA does not disclose the insulation layer with a dielectric constant lower than that of Al_2O_3.

Lee '323 discloses an insulation layer of Si_3N_4 and SiO_2 (col. 4, lines 36-40).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the insulation layer of AAPA with one of the insulation layers as taught by Lee.

The rationale is as follows: One of ordinary skill in the art at the time of the invention would have been motivated to replace the insulation layer of AAPA with one of the insulation layers as taught by Lee so that high mechanical strength, high thermal

stability, low leakage current and good etch selectivity to metal is obtained. The resulting insulation layer has a lower dielectric constant than that of Al_2O_3.

- Regarding claims 6 and 13, AAPA discloses the magnetoresistive effect multilayer is a tunnel magnetoresistive effect multilayer including a tunnel barrier layer and a pair of ferromagnetic thin film layers between which said tunnel barrier layer is sandwiched (pgs. 3-4).

- Regarding claims 7 and 14, AAPA discloses the magnetoresistive effect multilayer is a current perpendicular to the plane giant magnetoresistive effect multilayer including a nonmagnetic metal layer and a pair of ferromagnetic thin-film layers between which said nonmagnetic layer is sandwiched (pgs. 3-4).

2. Claims 4 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (hereinafter AAPA) (pgs. 2-4) as applied to claims 1 and 8 above, and further in view of Soeya et al. (hereinafter Soeya) (US 5,436,777).

- Regarding claims 4 and 11, AAPA shows all the features except the insulation layer with a dielectric constant lower than that of Al_2O_3 being hematite.

Soeya teaches hematite can be used as an insulator (col. 8, lines 59-62).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the insulation layer of AAPA with hematite as taught by Soeya.

The rationale is as follows: One of ordinary skill in the art at the time of the invention would have been motivated to replace the insulation layer of AAPA hematite

as taught by Lee so that a sufficient current is not allowed to flow through the magnetoresistive film (Soeya; col. 8, lines 62-65). The resulting insulation layer has a lower dielectric constant than that of Al_2O_3.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

a. Lazzari (US 3,848,217) is cited to show a magnetoresistive devices and transducers.

b. Ahn et al. (US 3,996,095) is cited to show an epitaxial process of forming ferrite, Fe_3O_4 and α-Fe_2O_3 thin films on special materials.

c. Anthony (US 5,302,461) is cited to show dielectric films for use in magnetorestitive transducers.

d. Dykes et al. (US 5,668,688) is cited to show a current perpendicular to the plane spin valve type magnetoresistive transducer.

e. Nakatani et al. (US 5,726,837) is cited to show a multilayer magnetoresistance effect type magnetic head.

f. Yamada et al. (US 6,046,890) is cited to show a method for protecting a magnetoresistive head from damage due to electrostatic discharge.

g. Yuan et al. (US 6,219,205) is cited to show a high-density giant magnetoresistive transducer with a recessed sensor.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher R. Beacham whose telephone number is (703) 605-4256. The examiner can normally be reached on M-F, 8: 00 am-5: 30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William Korzuch can be reached on (703) 305-6137. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-0377.

Christopher R. Beacham
Patent Examiner
Art Unit 2653

December 15, 2003

WILLIAM KORZUCH
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600